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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,416	09/18/2003	Peter J. Silverman	10559/870001/P17318/Intel	4385
20985 7590 05/03/2007 FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ROSASCO, STEPHEN D	
			ART UNIT 1756	PAPER NUMBER
			MAIL DATE 05/03/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/665,416

Applicant(s)

SILVERMAN, PETER J.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 21-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-20 and 27-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/18/03</u> . | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Applicant's election without traverse of Group II (claims 10-20 and 27-29) in the reply filed on 1/22/07 is acknowledged.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 10-13 and 17-20 rejected under 35 U.S.C. 102(e) as being anticipated by Yan (6,756,163).

Yan '163 addresses claims 10-13 and 17-20 (see claims) –

a mask blank comprising: a substrate made of a *low thermal expansion material*; a multilayer (ML) reflector on the substrate; and a re-usable coating on the substrate, the re-usable coating comprising: an outer capping layer made of an outer material and having an outer thickness; a ML stack below the outer capping layer, and an inner capping layer made of at least an inner material and having an inner thickness and located between the *ML stack and the ML reflector*, the inner thickness being selected to enable constructive interference between the ML stack and the ML reflector.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-20 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mirkanimi (6,489,066) or Yan (6,756,163) in view of Yan et al. (6,908,714) or Liang et al. (6,905,801).

The claimed invention is directed to an apparatus comprising a first multilayer of films on top of a substrate to form a flat top surface by a first deposition process; and a second multilayer of films on top of the first multilayer of films, the second multilayer of films effectuating a Bragg reflector to reflect extreme ultraviolet radiation, the second multilayer of films being deposited with a second deposition process.

And wherein the first and second multilayers of films comprise alternating layers of films, which comprise a first film and a second film with different optical properties.

And wherein the first and second multilayers comprise one of Molybdenum and Silicon films, Molybdenum and Beryllium films, and Molybdenum and Silicon compound films, wherein the Silicon compound comprises one of Silicon Nitride and Silicon Dioxide.

And wherein the first deposition process is an ion beam deposition process, and the second deposition process is an atomic layer deposition process.

The applicant discusses the differences between ion beam deposition and Atomic Layer Deposition, in that in atomic layer deposition the amount of defects in deposited layers may be much lower than layers deposited with ion beam deposition. Atomic layer deposition may generate fewer defects since the deposition is performed in an ultra-high vacuum environment that does not contain as many unwanted particles as in ion beam

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deposition. Unlike ion beam deposition, atomic layer deposition may tend to conformally coat a surface and may not tend to smooth or planarize substrate defects.

Mirkanimi teaches (see claims) a reticle for extreme ultraviolet lithography, having a substrate and a reflective multilayer, the improvement comprising: a buffer-layer consisting of a plurality of sequentially deposited and annealed layers.

And wherein said plurality of sequential deposited and annealed layers are composed of material selected from the group consisting of the same material as the reflective multilayer, a material different than that of the reflective multilayer, a combination the same and different materials as in the reflective multilayer.

And wherein said buffer-layer has an outer surface roughness of not greater than 0.3 nm.

And wherein depositing the multilayer coating is carried out by depositing at least one bilayer of material selected from the group consisting of Mo/Ru/Be and Mo/Be, Mo/Si ion-beam sputtered and deposited.

Yan '163 addresses claims 15-16 and 27-29 (see claims) –

a mask blank comprising: a substrate made of a *low thermal expansion material*; a multilayer (ML) reflector on the substrate; and a re-usable coating on the substrate, the re-usable coating comprising: an outer capping layer made of an outer material and having an outer thickness; a ML stack below the outer capping layer, and an inner capping layer made of at least an inner material and having an inner thickness and located between the *ML stack and the ML reflector*, the inner thickness being selected to enable constructive interference between the ML stack and the ML reflector.

The teachings of Mirkanimi (6,489,066) or Yan '163 differ from those of the applicant in that the applicant teaches (claim 14) that the second multilayer stack is deposited by *atomic layer deposition*.

Yan et al. '714 (col. 3, lines 35-41) teach that depending on the material selected, the improved absorber layer 1400 may be deposited by DC sputtering. In some cases, the improved absorber layer 1400 may be deposited by ion beam deposition (IBD) or atomic layer chemical vapor deposition (ALC).

Liang et al. teach (col. 4, lines 16+) that the EUV absorber layer (108) may be formed using conventional techniques, such as DC sputtering, ion beam deposition, and *atomic layer chemical vapor deposition*.

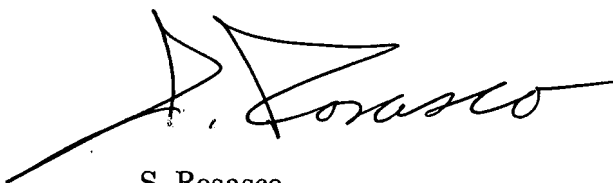
It would have been obvious to one having ordinary skill in the art to take the teachings of Mirkanimi or Yan '163 and combine them with the teachings of Yan et al. '714 or Liang et al. in order to make the claimed invention because the applicant is using a known technique for the known advantages of forming a more uniform layer than ion deposition.

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Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a long horizontal line extending to the left.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
04/26/07